Real-Time Drilling Geomechanics Reduces NPT

Wellbore stability prediction reduces risk in Gulf of Mexico well

CHALLENGE
Reduce NPT caused by wellbore stability issues in a Gulf of Mexico field.

SOLUTION
Implemented real-time drilling geomechanics services to monitor, update, and recalibrate the predrill pore pressure model; used daily updates to modify the drilling program as needed.

RESULT
Provided predictions that reduced NPT, enabled revised casing set point decisions, and eliminated a casing string.
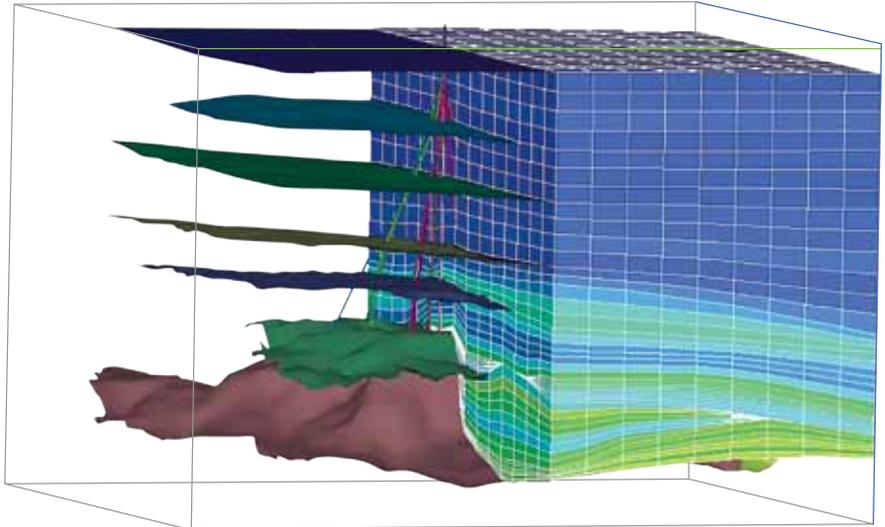
Real-time drilling geomechanics workflows and modeling predicted and mitigated wellbore stability issues during drilling operations.

A history of wellbore instability

The operator of a Gulf of Mexico field had a history of NPT related to wellbore stability problems. The most recent well had experienced losses, influx, stuck pipe, and cementing challenges.

As the team prepared for the next well, it focused on completing operations within the AFE and dealing with an expected pore pressure increase.

The real-time drilling geomechanics workflows and modeling predicted and mitigated wellbore stability issues.

Capitalizing on real-time data

The operator decided to utilize Schlumberger real-time drilling geomechanics services to make more-informed decisions during drilling operations.

Schlumberger experts used offset well information to build a temperature-dependent predrill pore pressure model. Engineers in Operation Support Centers (OSC*) continued real-time monitoring of drilling operations to update and recalibrate the pressure model using all available data, including

- gas information
- leakoff tests
- formation integrity tests
- logging-while-drilling resistivity and gamma ray data.
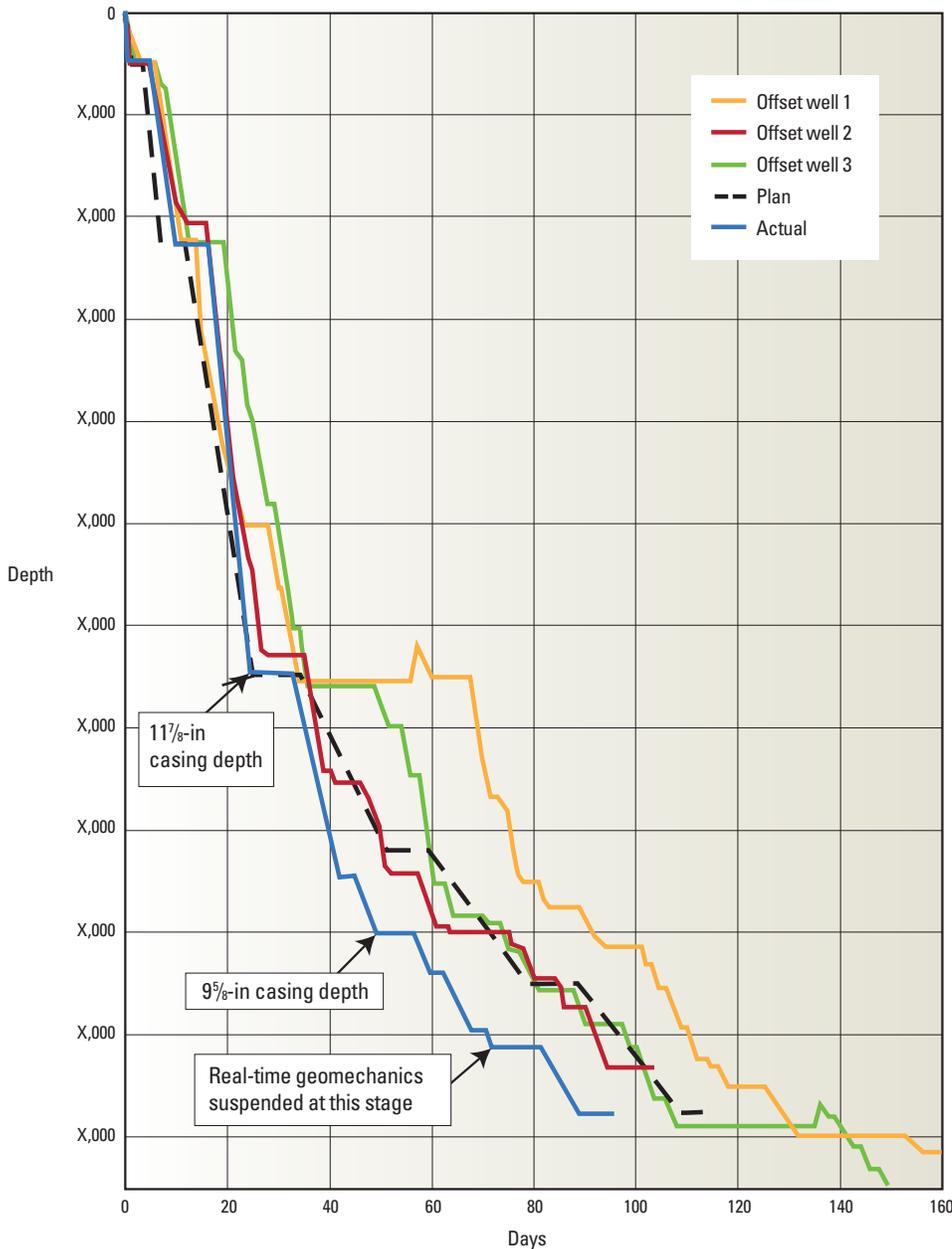
Real-time drilling geomechanics helped exceed the operator's expected technical limit, substantially reducing the time required.

The OSC team provided drilling risk forecasts and recommendations to the offshore and onshore drilling team through daily updates, or as needed. High levels of communication and seamless teamwork established a proactive approach that was key for successful drilling.

Enabling predictive decision making

The real-time geomechanics workflow and modeling predicted and mitigated wellbore stability issues during drilling operations. This process calculated a pore pressure ramp that was shallower and of greater magnitude than was anticipated from offset well information.

This resulted in an informed decision to set the 11⅞-in casing early. The 9⅝-in casing was then pushed 1,700 ft deeper than planned because further real-time modeling indicated no stability issues would be encountered. The operator therefore had the flexibility to save a liner string or finish the well in a 7½-in hole.

As the 9⅞-in hole was drilled below the 9⅝-in casing, real-time geomechanics modeling predicted a severe tightening of the mud weight window, requiring an unplanned 7¾-in casing string. Although the well was landed using a 6½-in × 7½-in bit, a slimhole section was avoided because the 9⅝-in casing had been pushed much deeper than expected.

High-quality real-time data and timely predictions enabled each hole section to be completed ahead of schedule with no losses, stuck pipe instances, or influx—reducing the risk of NPT. Additionally, the improved drilling process helped eliminate remedial cementing work.

Contact your local Schlumberger representative to learn more.

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